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COMPLETION REPORT

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OPERATION REDWING

U. S. ATOMIC ENERGY COMMISSION CONTRACT AT-(29-2)-20
PACIFIC PROVING GROUND 1954 - 1956

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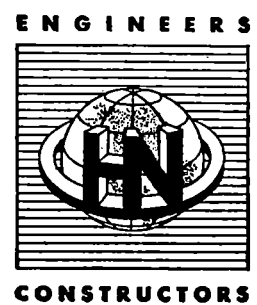
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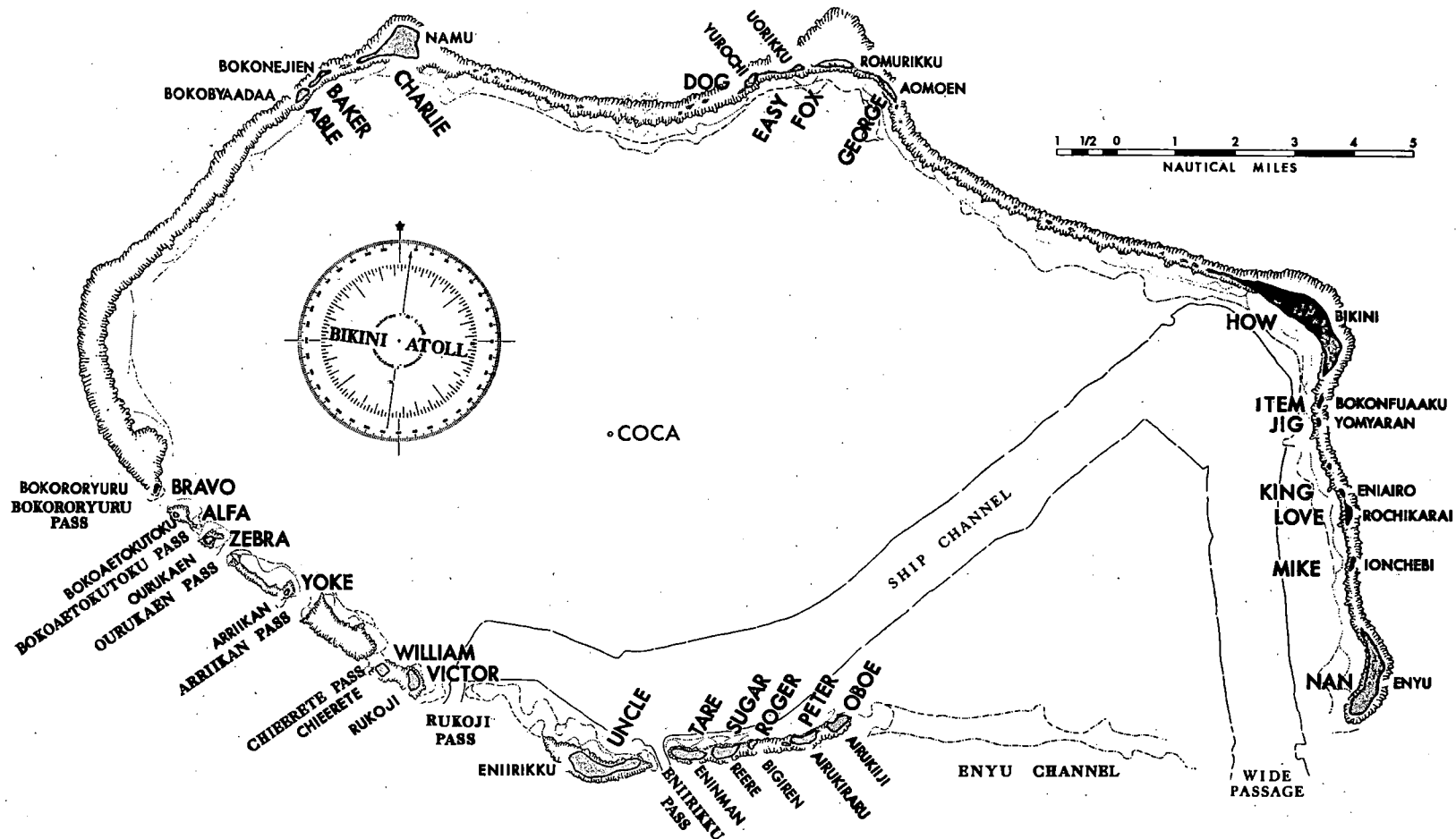
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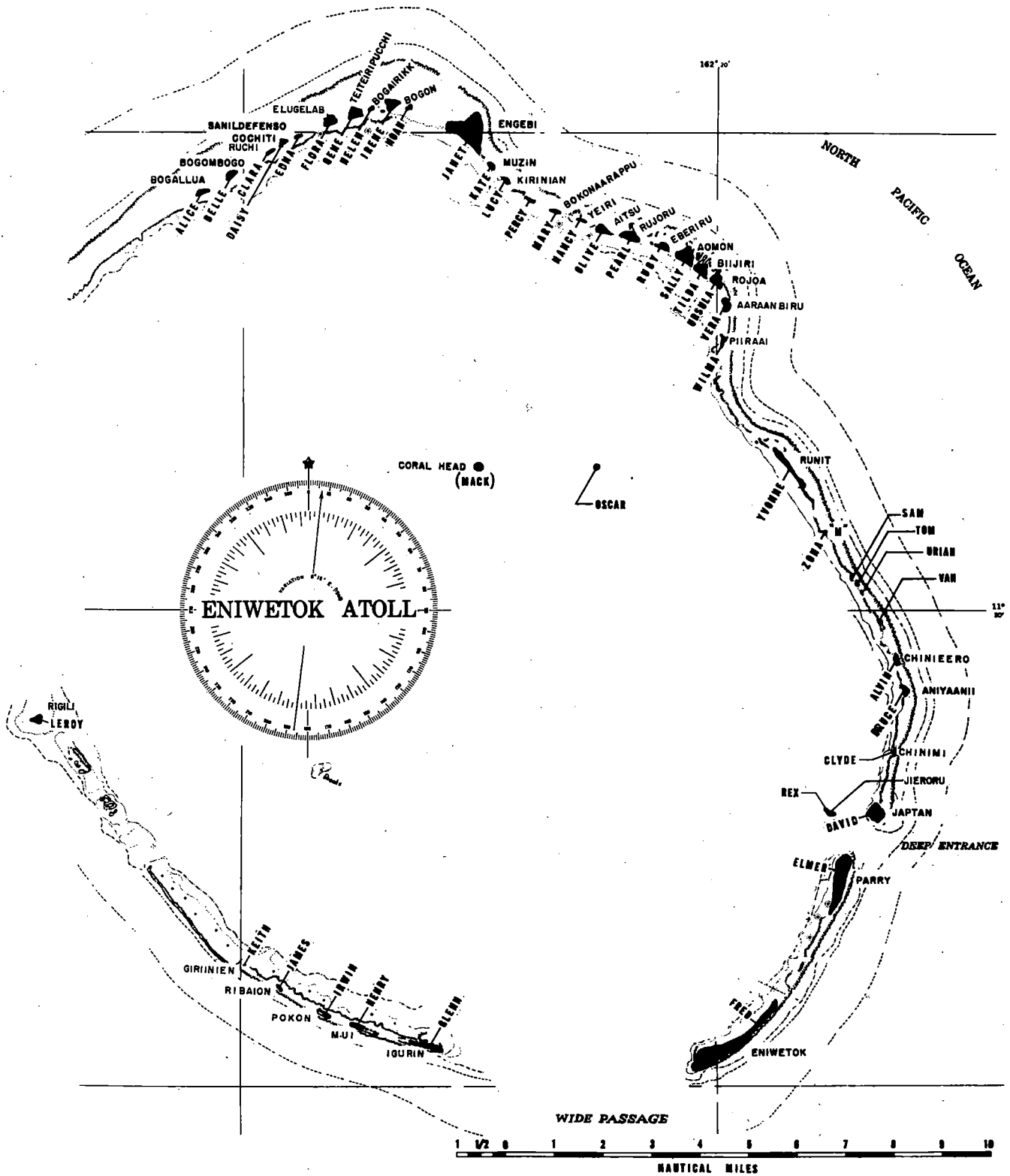


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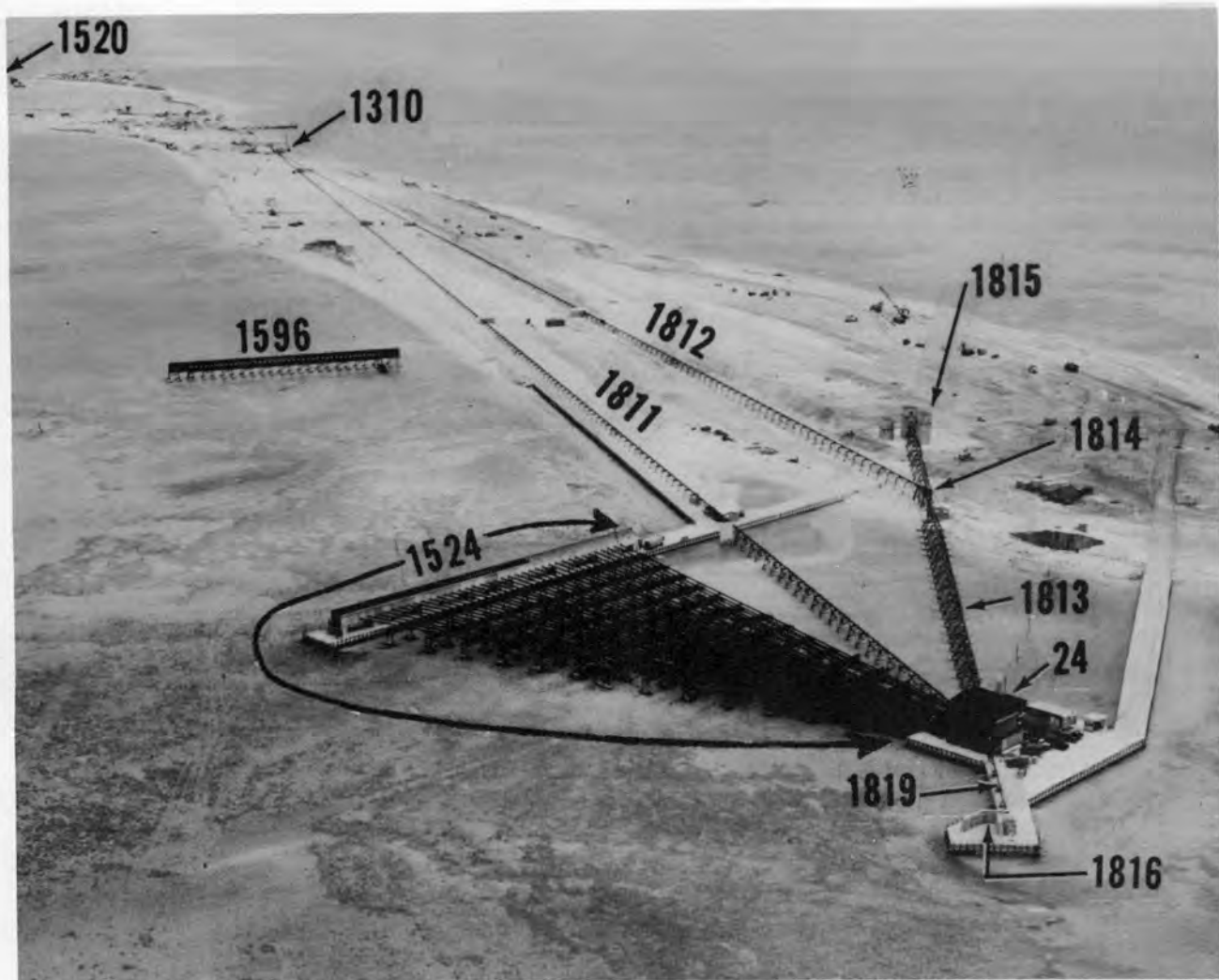


Figure 1-2. Major Scientific Stations - Yvonne

Construction activities with respect to scientific stations and temporary facilities were required on practically all islands of Eniwetok and Bikini as well as on seven other atolls in the Western Pacific Ocean area where four weather station and eight scientific projects were located.

Concurrent with the construction of scientific stations and temporary facilities, expansion and improvement of the Elmer and Fred camps were effected. The principal facilities added during the transitional period under P&E projects for the Fiscal Year 1955, as previously noted, were the deep-water pier, eleven barracks at Fred, and the second submarine power cable between Elmer and Fred. Additional plant and equipment projects approved for construction during Fiscal Year 1956 (P&E Projects 6001

and 6011) included 17 buildings at Fred and 18 buildings at Elmer, with a total building area of 147,494 sq. ft. for barracks, shops, warehouses, administration offices, and other uses. With the exception of the chapel at Elmer and the chapel and guest house on Fred, which were wooden structures, all the buildings added were prefabricated of either the all-aluminum (Pacific Iron & Steel) type or the steel frame with aluminum siding and roofing (Butler) type. To the Fred POL farm there were added two 5,000-barrel and two 10,000-barrel fuel storage tanks, filling and distribution lines, and fire protection and other appurtenances. The Elmer POL farm was modernized with a replacement of tanks and additional fire protection. A Joint AEC-Armed Forces Radio Receiving Station, including a camp to support approximately 20 operating personnel was constructed on David.



Figure 1-18. Ursula Complex



Figure 1-19. Causeways at Yvonne for Stations 24, 1524 and Program 18 Pipe Array



Figure 2-40. Pipe Arrays Leading to Station 24

due to temperature changes or any vibrations from being transmitted to the scientific equipment. Roller supports and expansion joints in front of the fixed supports maintained accurate pipe alignment and provided for the longitudinal movement of the pipes.

Power from the island primary distribution system led to a load center consisting of a disconnect switch, a 112.5 KVA transformer, and a circuit breaker secondary distribution panel of 120/208 volt, 3-phase, 4 wire, 60 cycle. This load center also provided the power to two trailer receptacles and Stations 1817.02, 1816 and 1312.01. The connected load was 80 KW. Power distribution for utility and scientific purposes within Station 24 was made through an 18-circuit lighting panel. The scientific power was supplied through a special steel cabinet equipped with 20 duplex receptacles. Power to the receptacles ran through a "variac" volt-

age control device which permitted adjustment from zero to 17 per cent above line voltage.

Timing signals were supplied through a 37-conductor cable terminating in a watertight 52-pair terminal cabinet. Telephone lines were provided through one 6-pair and four 1-pair cables terminating in a 52-pair terminal cabinet.

In the process of station construction, difficulty in pouring concrete was encountered due to the base of the foundation being underwater. This situation was overcome by placing the forms and back filling around them, thus forming a makeshift caisson. Prior to concrete placement, the water was pumped to as low a level as possible to eliminate dropping the concrete through the water. A total of 230 cubic yards of concrete was used in this station. The concrete cylinders taken averaged 4,421 psi when broken at 28 days. This average was high because a richer mix was used for the portion of the structure that was located in the water.

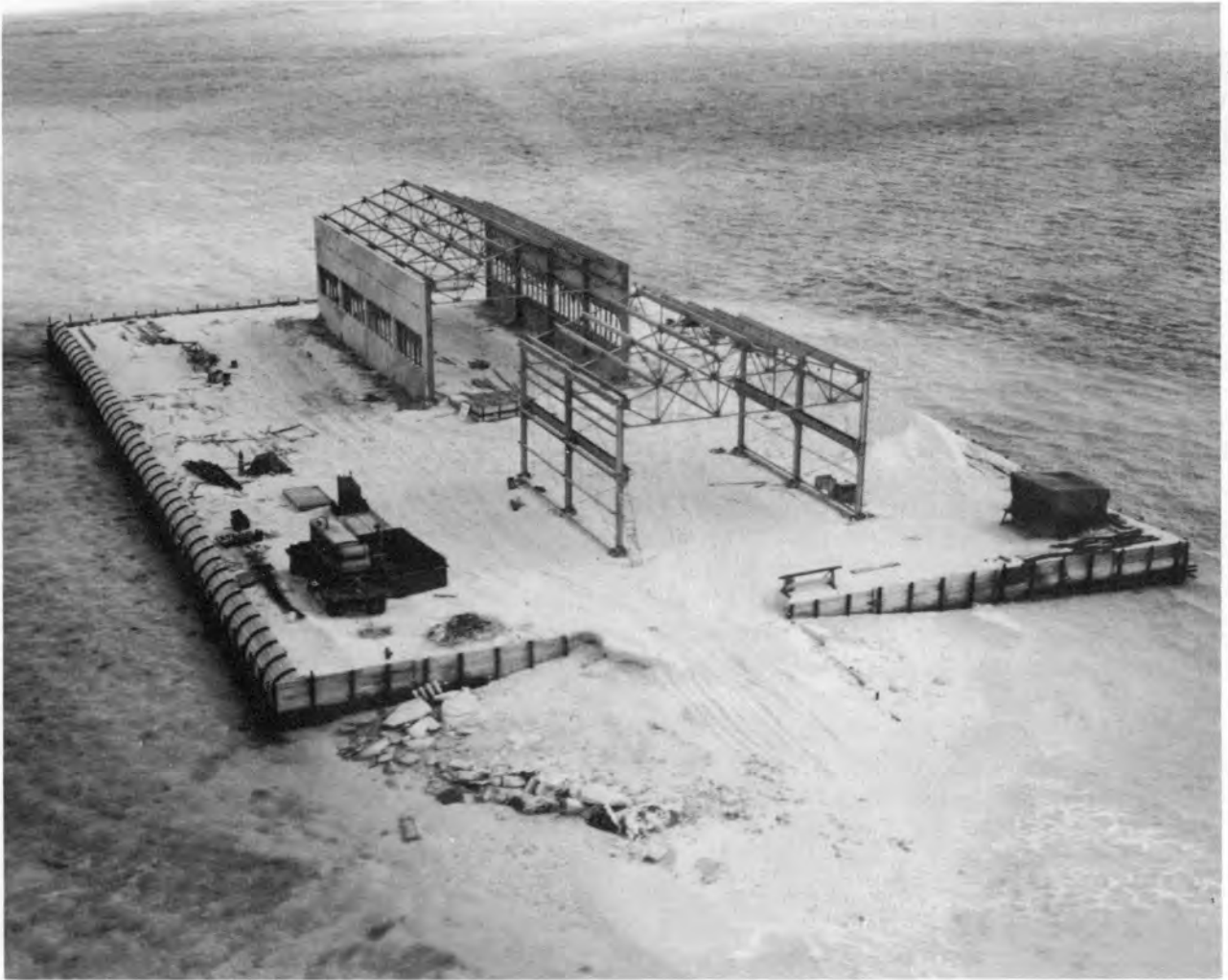


Figure 2-54. Stations 311.02, 310.03 and 312.03 Under Construction - Man-Made Island No. 3

two 60-pound rails 4' into the coral at each end of the foundation wall.

Soil conditions were more favorable for Station 311.03, Dog. The foundation scheme was similar to the other stations but footings were extended 2' below natural grade and no attempt was made to connect to coral. These footings had additional cover in that the final grade required several feet of fill on top of the natural grade.

Stations 310.01, .02 and .03 were steel trussed with roof and siding of corrugated asbestos. The ends of the buildings were left open. The asbestos material was frangible and therefore could be shattered, exposing the steel framework in case the roof and sides were subjected to blast pressures; this factor became the basis for the foundation design and influenced developing the strength of the exposed steel framework.



Figure 2-55. Stations 311.01 and 310.02 50% Complete - Man-Made Island No. 2

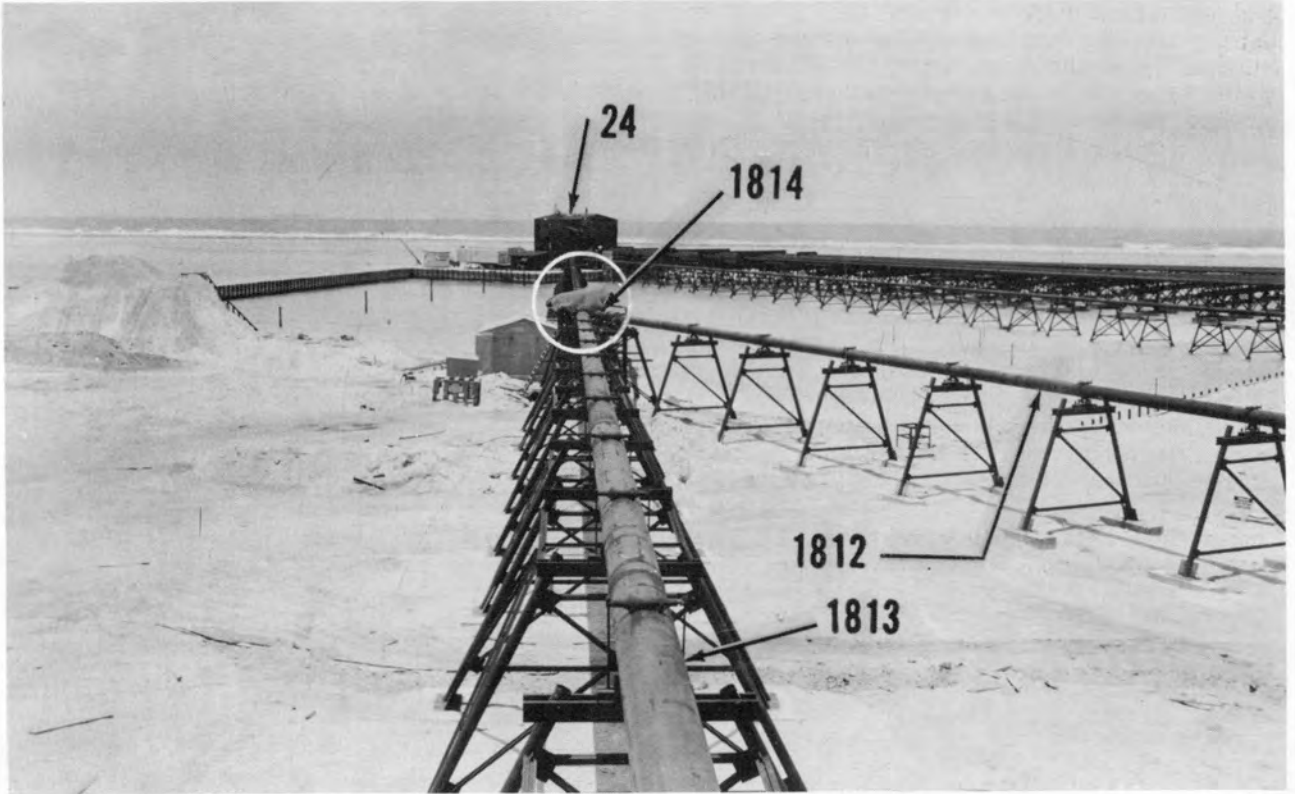


Figure 2-93. Stations 1812, 1813 and 1814

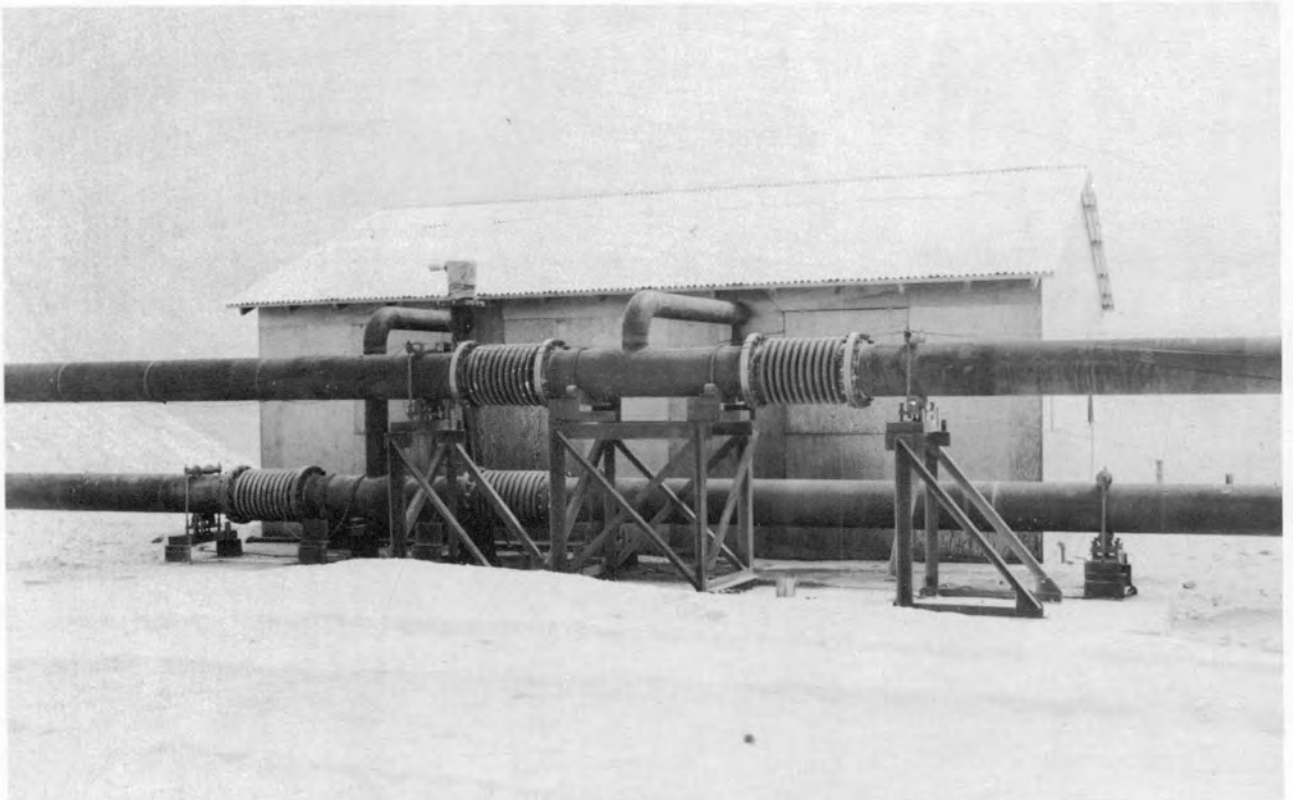


Figure 2-94. Stations 1811 and 1812 Pipe Connections to Station 1841

SECTION 4
FRESH WATER DISTILLATION AND DISTRIBUTION

The evaluation of the requirements for fresh water distillation units was based on the anticipated peak populations to be supported at each camp site. On 30 March 1955, a purchase order was awarded for the acquisition of six 200 gph units which were necessary to meet the then known requirements. On 7 July 1955, this order was increased to 11 such units, four of which were required for the off-atoll weather stations. The evaluation of fresh water requirements had to be reviewed periodically because of the changing number of persons expected to participate in REDWING. On 15 August 1955,

anticipated requirements had increased and a 600 gph unit was ordered. On 15 October, the over-all forecasted peak population was discussed in a conference at JTF-7 Headquarters in Washington and, as a result of the conference, it was determined that additional distillation plant capacities would be required at Elmer and Fred. A 2100 gph unit was located that was being assembled for export to a foreign country. The fabricator of this unit was willing to divert it, and a purchase order was awarded for its acquisition on 14 November. This unit was installed on Elmer and activated as the

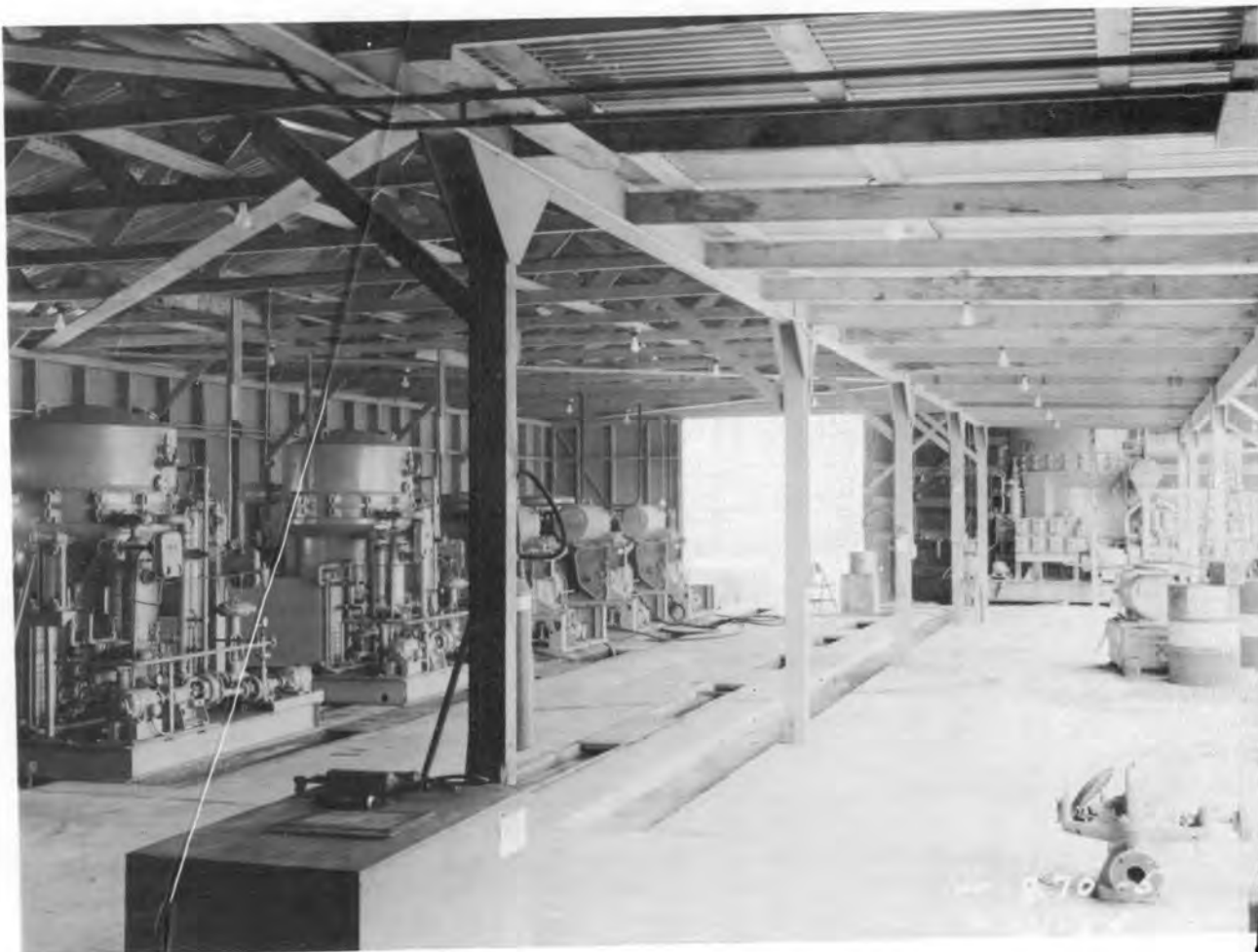


Figure 4-19. Distillation Plant - Nan

period of peak demand approached. With the acquisition of the 2100 gph unit, two of the 600 gph units previously assigned to Elmer were transferred to Fred. Table indicates the distribution of all units at the Proving Ground in April 1955 when all camps were in operation.

Because of the large influx of personnel at Elmer due to the evacuation of the northern islands in Eniwetok Atoll, it became necessary to increase the Elmer plant capacity. Units were available from the rolled-up camps. During the month of June, consumption at Elmer averaged 142,331 gallons per day. To meet this demand, one additional 600 gph unit and seven 200 gph units were installed. This installation provided a plant consisting of one 2100 gph unit, eight 600 gph units, and seven 200 gph units with a total daily rated capacity of 199,200 gallons. With a firm capacity based on 75 per cent of rated capacity, the plant capacity at this time was 149,400 gallons.

The average daily per capita consumption at each camp is shown in Table 4-14.



Figure 4-21. Beachhead Distillation Plant



Figure 4-20. Fresh and Salt Water Pipe - Being Installed



Figure 4-22. Typical Off-Island Water Tower